CLAIMS

- 1 1. A device for measuring alternating voltage in a
- 2 conductor under test, the device comprising first and second
- 3 sets of capacitive voltage sensors mounted on an electrically
- 4 insulating support member, the first set of sensors being
- 5 positioned along a first notional closed path and being
- 6 connected in parallel between a first signal conductor and a
- 7 reference conductor, the second set of sensors being
- 8 positioned along a second notional closed path surrounding
- 9 the first closed path and being connected in parallel between
- 10 a second signal conductor and the same reference conductor as
- 11 the first set, the support member being configured to allow a
- 12 conductor under test to be introduced into the interior of
- 13 the device so that the sensors surround the axis of the
- 14 conductor under test, and each sensor having a signal
- 15 electrode connected to the respective signal conductor and a
- 16 reference electrode connected to the reference conductor, the
- 17 sensors of the first set being orientated with the signal
- 18 electrode facing the conductor under test, and the sensors of
- 19 the second set being orientated with the signal electrode
- 20 facing away from the conductor under test, and the device
- 21 further including means for deriving the voltage in the
- 22 conductor under test as a function of the voltage across the
- 23 first signal conductor and the reference conductor and the

- 24 voltage across the second signal conductor and the reference
- 25 conductor.
 - 1 2. A device as claimed in claim 1, wherein each sensor of
 - 2 the second set is radially aligned, relative to the axis of a
 - 3 conductor under test, with a respective sensor of the first
 - 4 set.
 - 1 3. A device as claimed in claim 1, wherein each of said
 - 2 sensors is substantially identical to the others.
 - 1 4. A device as claimed in claim 1, wherein the notional
 - 2 closed paths are circular.
 - 1 5. A device as claimed in claim 1, wherein in each set the
 - 2 sensors are substantially equally spaced around the
 - 3 respective closed path.
 - 1 6. A device as claimed in claim 2, wherein each sensor of
 - 2 the second set is integral with a sensor of the first set
 - 3 whereby a plurality of composite sensors are arranged to
 - 4 provide both the first and second sets arranged around
 - 5 closely spaced first and second notional paths.

- 1 7. A device as claimed in claim 1, wherein each reference
- 2 electrode is substantially larger in area than the
- 3 corresponding signal electrode so as to shield the latter
- 4 from electric fields on the side of the sensor opposite the
- 5 signal electrode.
- 1 8. A device as claimed in claim 1, wherein each sensor
- 2 comprises a parallel plate capacitor whose plates,
- 3 constituted by the signal and reference electrodes, are
- 4 substantially normal to the radial direction of the conductor
- 5 under test.
- 1 9. A device as claimed in claim 1, wherein each sensor
- 2 comprises multiple insulating substrates laminated together
- 3 with a signal electrode and at least one reference electrode
- 4 separated by at least one of said insulating substrates.
- 1 10. A device as claimed in claim 9, wherein the support
- 2 member comprises multiple insulating substrates laminated
- 3 together with the sensors inserted in aligned apertures in
- 4 the substrates, the sensors being connected in parallel as
- 5 aforesaid by at least one signal conductor and at least one
- 6 reference conductor deposited on non-adjacent surfaces of
- 7 respective support member substrates.

- 1 11. A device as claimed in claim 10, wherein in the
- 2 multilayer support structure the signal conductor(s) are
- 3 formed as conductive track(s) sandwiched between a pair of
- 4 reference conductors also formed as conductive tracks, the
- 5 width of the reference conductive tracks being substantially
- 6 greater than the width of the signal conductor track(s) so
- 7 that the latter is/are shielded from external electric
- 8 fields.